

Spot Safety Project Evaluation

Project Log # 200512145

Spot Safety Project # 10-96-213

**Spot Safety Project Evaluation of the Traffic Signal Installation
At the Intersection of SR 3468 (Weddington Rd) and SR 3448 (Pleasants
Plains/S. Trade St)
Mecklenburg County**

Documents Prepared By:

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9/5/2006
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 10-96-213 – The Intersection of SR 3468 (Weddington Rd) and SR 3448 (Pleasants Plains/S. Trade St) in Mecklenburg County.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of a 2-phase, fully actuated traffic signal. SR 3468 (Weddington Rd) and SR 3448 (Pleasants Plains/S. Trade St) are both 2-lane roads with speed limits of 55 mph at the subject location. There is a right turn slip ramp for southbound traffic on SR 3448 to turn onto SR 3468. The subject location is a three-leg intersection, which was controlled by a stop sign on SR 3468 (Weddington Rd) in the before period.

There is a curve in the roadway just before the intersection on the northwest approach of SR 3448. Trees on the roadside along the curve limit site distance approaching the intersection.

The original statement of problem was that there were accidents, congestion, and excessive delay due to a high volume of traffic entering the intersection.

The initial crash analysis was completed from January 1, 1992 to January 1, 1996 with 11 reported crashes; 5 Angle Crashes, 3 Rear-End Crashes, 2 Left Turn-Same Roadway Crashes, and 1 Ran-Off-Road Crash. The final completion date for the improvement at the subject intersection was on November 19, 1997 with a total cost of \$35,000.00.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from October 1, 1997 to December 31, 1997. The before period consisted of reported crashes from January 1, 1990 through September 30, 1997 (7 years and 9 months) and the after period consisted of reported crashes from January 1, 1998 through September 30, 2005 (7 years and 9 months). The beginning date for this analysis was determined by available crash data at the time the crash analysis was completed.

The treatment data consisted of all crashes within 150 feet of the subject intersection. *Please see attached location map and photos for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	32	32	0
Total Severity Index	5.22	3.08	-41
Target Crashes	14	14	0
Target Crash Severity Index	4.17	4.17	0
Volume	14,000	18,000	28.6
<u>Injury Summary</u>			
Fatal injuries	0	0	N/A
Class A injuries	2	0	-100.0
Class B injuries	1	2	100.0
Class C Injuries	15	14	-6.7
Total Non-Fatal Injuries	18	16	-11.1
Total Injuries	18	16	-11.1

The naive before and after analysis at the treatment location resulted in no change in either Total Crashes or Target Crashes, a 41 percent decrease in the Total Severity Index, and a 29 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1993 and the after period ADT year was 2001.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in no change in either Total Crashes or Target Crashes. The summary results above demonstrate that both Total Crashes and Target Crashes appear to have remained constant at the treatment location from the before to the after period.

Although the crashes remained constant from the before to the after period, there was both an increase in ADT (29%) and a decrease in the Total Severity Index (-41%). As seen in the previous table, injuries of all types except for “B” decreased.

The two class “A” injuries in the before period were related to a Ran-Off-Road crash. As seen in the *Collision Diagram, Before Period*, there were four Ran-Off-Road crashes for southbound vehicles on SR 3448 just past the intersection in the before period. Two of these crashes were in wet road conditions. This pattern has disappeared in the after period. It is unsure how or if the signal effected this crash type.

Again referencing the *Collision Diagrams*, a pattern of Left Turn-Different Roadway Crashes can be seen in the before period from vehicles turning onto SR 3448 from SR 3468 (10 crashes). This pattern of crashes has been eliminated in the after period by the countermeasure (0 crashes).

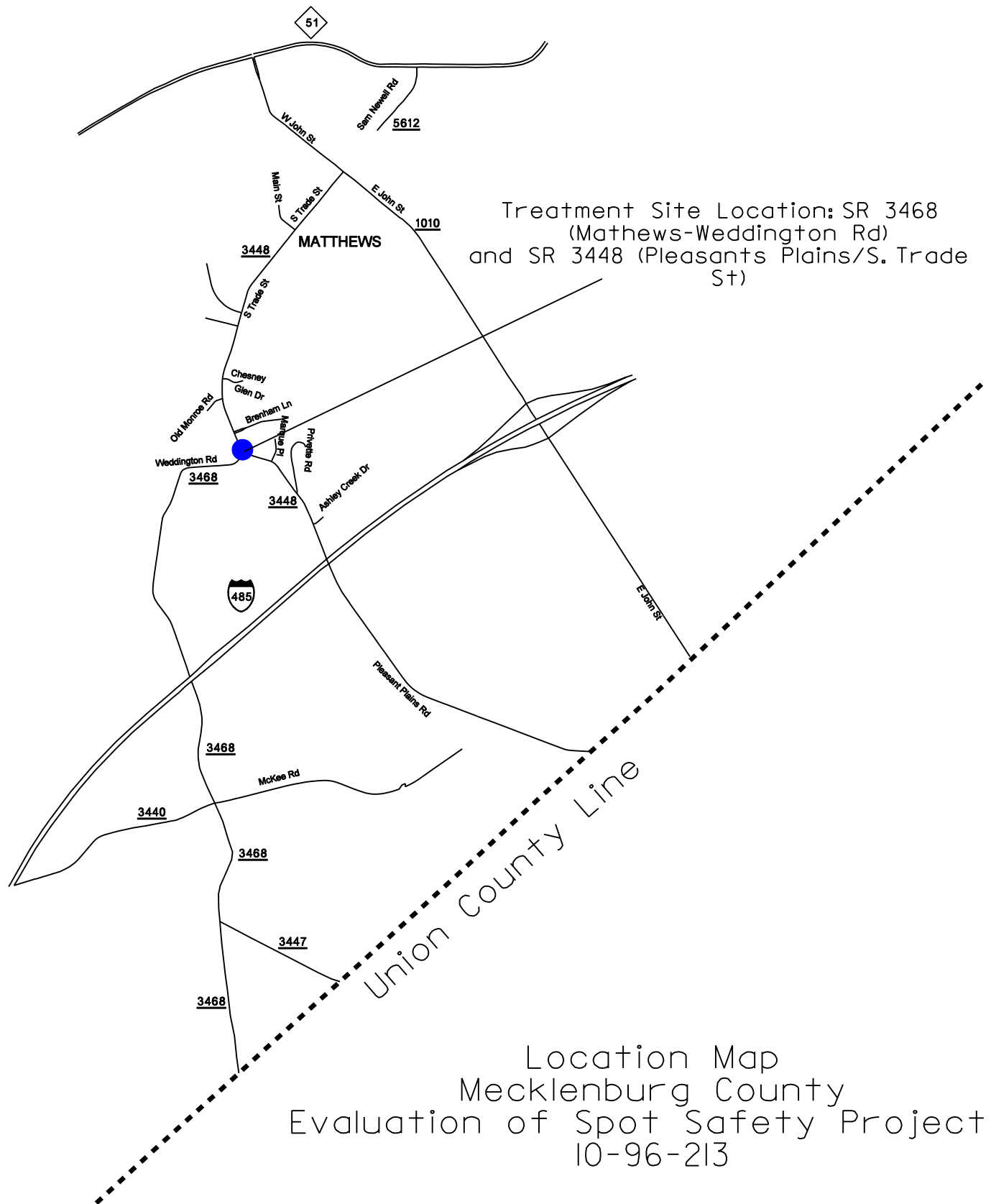
A new crash pattern of Left Turn-Same Roadway Crashes involving northbound SR 3448 vehicles turning left onto SR 3468 emerged after the signal was installed. While only three such crashes occurred in the before period, 13 occurred in the after period. There is limited site distance on the northern approach to the intersection (as described in the *Project Background* section). In addition, the installation of the signal might contribute to drivers paying less attention to oncoming vehicles. In two crash reports, it was explicitly stated that the left-turning driver thought that they had the right-of-way.

Rear-End crashes at the intersection have also increased from the before to the after period, especially on SR 3468. Rear-End crashes increased 300 percent (from 1 to 4) on SR 3468 from the before to the after period.

Rear-End crashes on the right-turn slip ramp from SR 3448 to SR 3468 also increased (from 3 to 6) from the before to the after period. This increase could possibly be due to southbound right-turning drivers seeing that they have the green signal and not realizing they might have to yield to northbound left-turning traffic. It is also possible that some drivers do not understand the yield sign controlling the slip ramp, and are therefore stopping when they do not need to.

Please see the attached *Treatment Site Photos*. Photos are provided for all approaches to the treatment intersection.

As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.



Treatment Site Photos Taken July 11, 2006



Traveling South on SR 3448 (S. Trade St)



Traveling South on SR 3448 (S. Trade St)

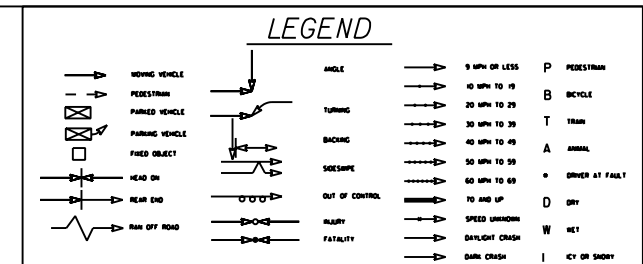
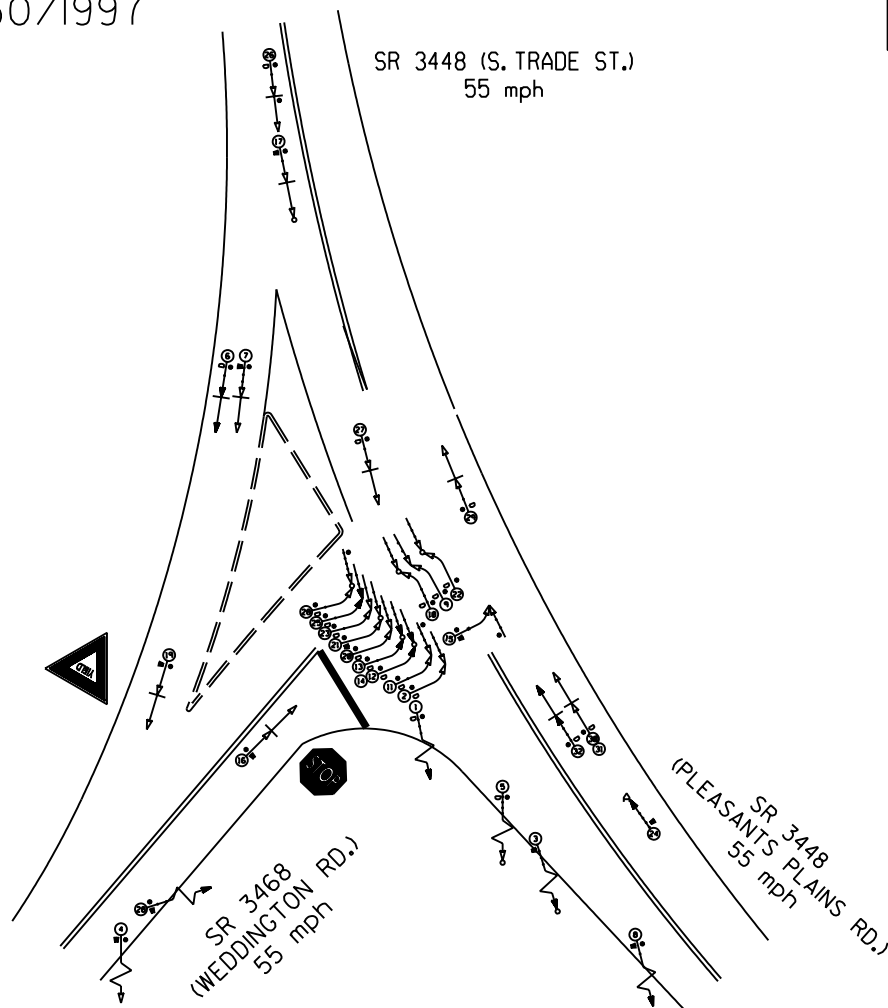



Traveling North-West on SR 2448 (Pleasant Plains Rd)
Notice the limited site distance due to the curve and trees



Traveling East on SR 3468 (Weddington Rd)

Mecklenburg County
 SR 3448 (Pleasants Plains Rd/
 S. Trade St) at SR 3468 (Weddington Rd)
 Treatment Site in the Before Period
 From 1/1/1990-9/30/1997



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		COLLISION DIAGRAM	
<small>HIGHWAY SAFETY IMPROVEMENT PROGRAM</small>	<small>SAFETY INFORMATION MANAGEMENT AND SUPPORT</small>	DIVISION: 10	AREA: ..
		STUDY PERIOD: 1/1/1990 TO 9/30/1997	
		DISTANCE: Y-LINE: 150 FT	
		ANALYSIS PREPARED BY: B.80010800	
		DIAGRAM PREPARED BY: B.80010800	
SAFETY EVALUATION		DIAGRAM REVIEWED BY:	
BEFORE SIGNAL INSTALLATION		SCALE: NOT TO SCALE	
		DATE: 8/21/2006	
		LOG NUMBER: 20050245	
N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH			

Mecklenburg County
 SR 3448 (Pleasant Plains Rd/
 S. Trade St) at SR 3468 (Weddington Rd)
 Treatment Site in the After Period
 From 1/1/1998-9/30/2005

